DEPARTMENT OF MINES AND RESOURCES

BUREAU OF MINES

CANADA

Ottawa, August 8, 1947.

REPORT

of the

MINERAL DRESSING AND METALLURGICAL LABORATORIES.

Investigation No. 2267.

Concentration Tests on a Sample of Gold Ore from the Venus Mine, near Carcross, Yukon Territory.

Note:

This report relates essentially to the samples as received. It shall not, nor any correspondence connected therewith, be used in part or in full as publicity or advertising matter for the sale of shares in any promotion.

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DEPARTMENT
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Mines and Geology Branch

OTTAWA August 8, 1947.

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Concentration Tests on a Sample of Gold Ore
from the Venus Mine, near Carcross,
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Shipment:

One sack of ore, weighing 33 pounds and crushed to minus 1/4 inch, was received on May 9, 1947. The sample was transshipped from the Denver Equipment Co., Denver, Colo., at the request of F. L. C. Price, Transcontinental Resources Limited, Box 907, Dawson, Yukon, Canada.

Location of Property:

This sample of ore was taken from the Venus Mine, near Carcross in the central southern section of Yukon Territory.

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Sampling and Assaying:

The shipment was sampled, assayed, and reported as follows:

Gold - 0.155 oz./ton
Silver - 1.165 "
Lead - 0.38 per cent
Iron - 8.59 "
Arsenic - 5.75 "
Sulphur - 3.61 "
Insoluble - 74.49 "

Purpose of the Test:

The test was conducted to find out whether or not a high grade concentrate, one that would bear high shipping costs, could be produced. In view of the low grade of the ore, high recovery and high ratio of concentration would be essential.

Tests Conducted:

Concentration tests were conducted by flotation, tabling, and jigging. A cyanidation test was also conducted to get some information about the refractory qualities of the ore.

Character of the Sample:

Since the ore was finely crushed as received, no polished sections were made of it. After the sample had been crushed to -20 mesh, however, a sulphide concentrate was prepared by hand panning and an effort was made to get some information about the occurrence of the gold. Two polished sections were made and examined under the reflecting microscope and reported as follows:

General Description -

Metallic minerals are abundantly distributed through the mounting medium (bakelite) as irregular grains and imperfect crystals which range from about 600 microns (+28 Tyler mesh) down to only a few microns in size. An occasional grain of gangue is also visible embedded in bakelite. In general, the

(Character of the Ore, cont'd) -

metallic minerals are free but are sometimes combined with each other and/or with gangue. Arsenopyrite predominates with minor amounts of pyrite and galena and a few grains of "limonite" which are usually associated with pyrite or arsenopyrite.

Two grains of native gold, 78 microns (-150+200 Tyler mesh) and 24 microns (-560+800 Tyler mesh) in size, were observed in the sections. The larger grain is irregular in shape and is free in bakelite; the smaller particle is more or less equidimensional in shape and is penetrating arsenopyrite but is not entirely surrounded by the sulphide (see Figure 1). A grain of native metal was also seen with the unaided eye in a jig concentrate during test work.

Conclusions from Microscopic Examination -

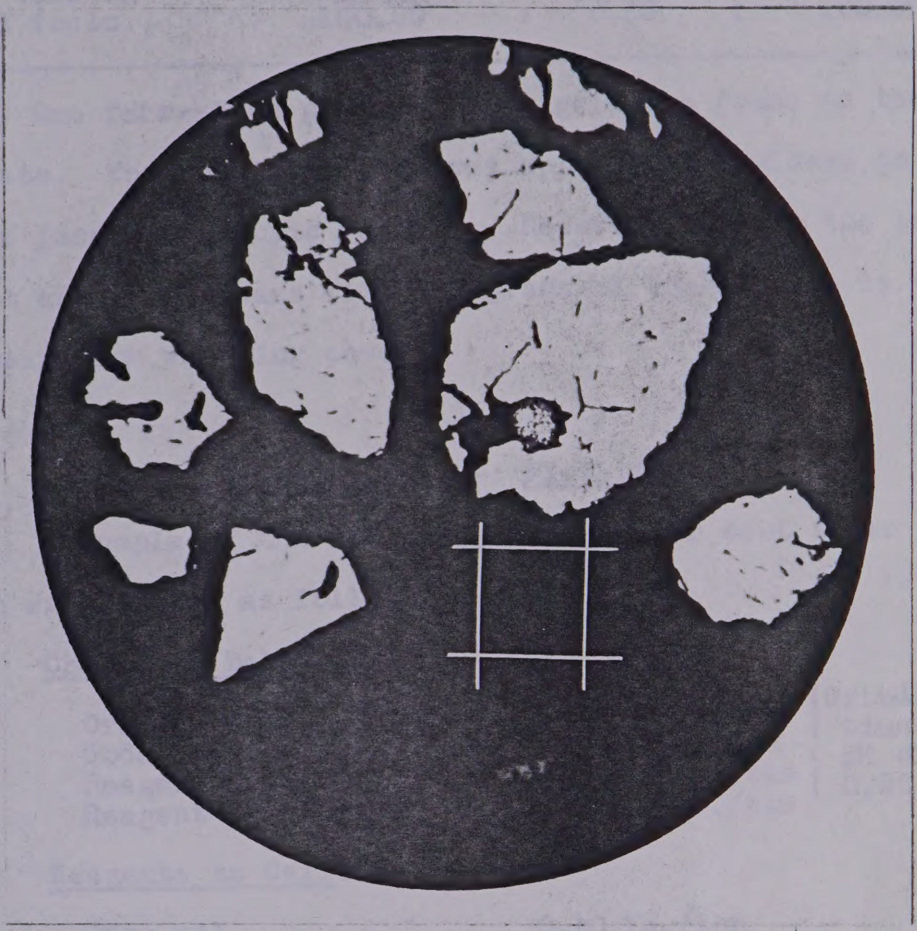
From the meagre information gleaned from the microscopic examination, the following conclusions are indicated:

1. Gold occurs as native metal and at least some of it appears to be associated with arsenopyrite.
2. The gold may not be so tightly tied up with the arsenic mineral as to require roasting. A look at Figure 1 shows that cyanide solutions would be able to attack this grain of gold even without further grinding. The information on this point is so skimpy, however, it will require ample test work to prove or to disprove it.
3. Arsenopyrite appears to be sufficiently abundant to act as a cyanicide.
4. Since neither native silver nor a silver mineral is visible in the polished sections, it is very probable that this metal is carried by the galena.

It must not be forgotten that these conclusions are drawn from the microscopic study of only two polished sections made from a panned concentrate of the head sample, and, therefore,

will hold good only insofar as the two sections are representative of the ore as a whole.

Figure 1.



X200.

PHOTOMICROGRAPH SHOWING TINY PARTICLE OF GOLD (WHITE, ROUGH SURFACE) EMBAYED IN GRAIN OF ARSENOPYRITE (WHITE, SMOOTH SURFACE).

Bakelite is black and a 200-mesh Tyler screen opening is shown in white. Reflected light.

DETAILS OF INVESTIGATION:

Test No. 1. - Jig Concentration.

A sample of the ore at -20 mesh was treated in a gold jig for the purpose of producing a high grade concentrate.

(Continued on next page)

(Details of Investigation, cont'd) -

Results of Test No. 1:

Product	Weight, per cent	Assay, Au, oz./ton	Distribution, per cent total gold
Jig concentrate	5.22	2.18	50.13
Jig tailing	94.78	0.12	49.87
Feed (calc.)	100.00	0.23	100.00

One fair-sized grain of free gold was found in the jig concentrate. The remaining gold was apparently enclosed in the sulphides (see microscopic report). Recovery is much too low in this test and at the same time the grade of concentrate is too low to bear high shipping costs.

Test No. 2. - Flotation.

A sample of the ore was ground 60 per cent finer than 200 mesh and floated as follows:

Charge to Ball Mill:

Ore	1,000 grams
Soda ash	2.0 lb./ton
Reagent No. 208	0.10 lb./ton
Reagent No. 301	0.10 lb./ton

(Grinding
(time, 15 mi
(pH of pulp,
(8.25.

Reagents to Cell:

Pine oil	0.10 lb./ton

The concentrate was cleaned once with one additional drop of pine oil.

Results of Test No. 2:

Product	Weight, per cent	Assays Oz./ton Au	Assays Oz./ton Ag	Assays P.c. Pb	Distribution, per cent Au	Distribution, per cent Ag	Distribution, per cent Pb
Flotation conc.	4.16	1.46	12.86	3.96	38.99	45.69	46.3
Cleaner tailing	1.95	0.30	4.20	1.12	3.76	7.00	6.1
Flotation tailing	93.89	0.095	0.59	0.18	57.25	47.31	47.5
Feed (calc.)	100.00	0.156	1.17	0.36	100.00	100.00	100.0

Although the sample showed unmistakable signs of extensive oxidation, this test was tried to see what could be done by flotation. The concentrate is too low grade and recovery is also low.

(Details of Investigation, cont'd) -

Test No. 3. - Table Concentration.

A sample of the ore at -20 mesh was screened on 35, 48, 65 and 100 mesh screens. The fractions were concentrated separately on a small Wilfley table. The various size fractions of the table sand were assayed separately but the concentrates were all mixed together and assayed as one lot.

Screen Analysis of Table Sands:

Size	Weight, per cent of product	Assays, oz./ton	
		Au	Ag
-20+35 mesh	23.8	0.025	0.455
-35+48 "	25.3	0.015	0.345
-48+65 "	23.0	0.02	0.47
-65+100 "	14.5	0.03	0.49
-100 "	13.4	0.11	0.86
Average sand tailing	100.0	0.033	0.49

Results of Test No. 3:

Product	Weight, per cent	Assays, oz./ton		Distribution, per cent	
		Au	Ag	Au	Ag
Table conc.	12.66	0.92	4.78	60.49	46.32
Table sand tailing	59.05	0.033	0.49	10.12	20.34
Table slime tailing	28.29	0.20	1.54	29.39	33.34
Feed (calc.)	100.00	0.193	1.31	100.00	100.00

The high assays in the finer portions of the sand tailing as well as in the table slime indicate the presence of fine gold in sulphides (see photomicrograph, Figure 1).

Test No. 4. - Cyanidation.

A sample of the ore was ground 66 per cent finer than 200 mesh and agitated in cyanide solution for 65 hours. This test was conducted as a further confirmation of the presence of fine refractory gold in sulphides.

Screen Analysis of Cyanide Tailing:

Size	Weight, per cent	Assay, Au, oz./ton
+150 mesh	15.1	0.038
-150+200 "	17.70	0.055
-200 "	67.20	0.09
Average cyanide tailing	100.0	0.078

(Continued on next page)

(Details of Investigation, cont'd) -

The higher assays in the finer fractions again confirmed the presence of considerable quantities of fine gold in the sulphides as shown in the photomicrograph.

Summary of Results:

Feed sample	-	0.155 Au oz./ton
Cyanide tailing	-	0.078 " "
Extraction of gold	-	49.68 per cent

Reagents consumed,		lb./ton ore:
NaCN	-	0.98
CaO	-	9.60

Conclusions:

1. Owing to the wide distribution of fine gold in sulphides, chiefly arsenopyrite, it is impossible to prepare a concentrate that would bear high shipping costs and at the same time show a reasonable recovery.

2. Because of the decidedly oxidized condition of the ore, gravity concentration is preferable to flotation.

3. The ore is very low grade in silver and lead, and could be considered a gold ore only under favourable conditions.

4. Concentration and roasting appear to be necessary in order to extract the gold with cyanide solution.

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